NON-PUBLIC?: N
ACCESSION #: 9008010023
LICENSEE EVENT REPORT (LER)

FACILITY NAME: LaSalle County Station Unit 1 PAGE: 1 OF 07

DOCKET NUMBER: 05000373

TITLE: Reactor Scram during Surveillance Testing due to Mounting Bolts for Turbine Stop Valve Open Limit Switch Vibrating Loose
EVENT DATE: 06/26/90 LER #: 90-010-00 REPORT DATE: 07/26/90

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 075

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Joseph J. Tokarz, Technical TELEPHONE: (815) 357-6761
Staff Engineer, ext. 2875

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: JC COMPONENT: LS MANUFACTURER: N007
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On June 26, 1990 at 0453 hours with Unit 1 in Operational Condition 1 (Run) at 75% power, a reactor scram occurred during the performance of LaSalle Limited Procedure LLP-90-027, "Unit 1 Turbine Stop Valve (TSV) Scram Functional Test". The scram occurred as designed, due to the closing of Turbine Stop Valves 1, 3, and 4 after #2 TSV was cycled and its open limit switch failed. It was discovered during the scram investigation that the #2 TSV Open Limit Switch (SVOS-2, non Reactor Protection System limit switch) had failed to the Not Open position. This failure occurred May 22, 1990 at 0359 hours, the last time this procedure was performed. At this time, the valve test logic of Turbine Electro Hydraulic Control system (EHC) sealed in the Master/Slave interlock. This prevents the other TSVs from closing while #2 TSV is tested.

On June 26, 1990 at 0453 hours, #2 TSV was tested and closed to about 90% open. When the valve fully opened, limit switch SVOS-2 toggled to the open position (due to a loose mounting of the switch, caused by vibrations). This broke the seal-in interlock. A second later, it toggled back to give a Not open alarm and commanded the other TSVs to go full close.

The Emergency Core Cooling Systems (ECCS) and the Reactor Core Isolation Cooling System were available during the event. All other systems operated as expected during the reactor scram with exception of the 1B Turbine Driven Reactor Feedwater Pump (TDRFP) which did not trip when the manual pushbutton was depressed. The 1B TDRFP was subsequently tripped by using the overspeed test switch.

The #2 TSV limit switch mounting bolts were tightened and its circuitry tested. Temporary System Changes and modifications will be installed to improve the logic to prevent recurrence of this type of event. The 1B TDRFP was tested and functioned as designed.

This event is being reported to the NRC pursuant to the requirements of 10CFR50.73(a)(2)(iv) due to the actuation of an Engineered safety Feature System.

END OF ABSTRACT

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as XX!.

A. CONDITION PRIOR TO EVENT

Unit(s): 1 Event Date: 6/26/90 Event Time: 0453 Hours

Reactor Mode(s): 1 Mode(s) Name: Run Power Level(s): 75%

B. DESCRIPTION OF EVENT

On June 26, 1990 at 0453 hours with Unit 1 in Operational Condition 1 (Run) at 75% power, a reactor scram occurred during the performance of LaSalle Limited Procedure LLP-90-027, "Unit 1 Turbine Stop Valve (TSV) Scram Functional Test". This procedure was being

performed in place of LaSalle Operating Procedure LOS-RP-M3, "Turbine Stop Valve Scram Functional Test" to prevent full scrams due to #3 TSV Reactor Protection System (RP) JC! limit switch being in a tripped condition and out of service. The scram occurred as designed due to the inadvertent closing of Turbine Stop Valves 1, 3, and 4 after #2 TSV was cycled to approximately 90% open.

It was discovered during the scram investigation that the #2 Turbine Stop Valve Open Limit Switch (SVOS-2, non RP limit Switch) had failed to the Not Open position. This failure occurred May 22, 1990 at 0359 hours, the last time this procedure was performed. Alarm typer identified #2 TSV Not Open (typed in red). This was caused by SVOS-2 and would have sounded an audible alarm (if operable) in the control room, requiring an operator to acknowledge the alarm. Since valve testing was in progress, this may have been considered an anticipated alarm. At this time, the valve test logic of Turbine Electro Hydraulic Control system (EHC) TG! sealed in the Master/Slave interlock. This prevents the other TSVs from closing while #2 TSV is tested. Limit Switch SVOS-2 provides two contact functions. One contact controls the Master/Slave relationship between 2 and 1, 3, & 4 (2 closes, then 1, 3, & 4 close) and the other contact feeds to the alarm typer (Figure 1).

On June 26, 1990 at 0453 hours, #2 TSV was tested and closed to about 90% open. When the valve fully opened, limit switch SVOS-2 toggled to the open position. This broke the seal-in interlock. A second later, it toggled back to give a Not Open alarm and commanded the other TSVs to go full close. #2 TSV stayed full open while the others closed to cause the scram on more than 2 TSVs Not Open.

The Emergency Core Cooling Systems (ECCS) and the Reactor Core Isolation Cooling System (RCIC, RI) BN! were available during the event, if required. All other systems operated as expected during the reactor scram with exception of the 1B Turbine Driven Reactor Feedwater (FW) SJ! Pump (TDRFP) which did not trip when the manual pushbutton was depressed. The 1B TDRFP was subsequently tripped by using the overspeed test switch.

This event is being reported to the NRC pursuant to the requirements of 10CFR50.73(a)(2)(iv) due to the actuation of an Engineered safety Feature System.

C. APPARENT CAUSE OF EVENT

Limit Switch SVOS-2 is held in place by four mounting bolts. During the scram investigation it was found that these four mounting bolts for SVOS-2 had vibrated loose. This explains the failure of SVOS-2 to maintain its contacts while #2 TSV was open.

The alarm typer can provide an alarm summary upon request. This summary, not required at any frequency, would have shown that Limit Switch SVOS-2 Not Open condition existed while the valve was full open. Even if this condition was identified, it is possible corrective action may have been delayed since another limit switch (RP limit switch) was available for position information.

The cause of the 1B TDRFP failure to trip with the pushbutton from the control room is unknown at this time and still under investigation.

D. SAFETY ANALYSIS OF EVENT

The safety significance was minimal. These Non Safety Related Turbine Stop Valves would have still performed to isolate the turbine on a turbine trip when the hydraulic control system depressurizes as designed.

The ECCS and the RCIC System were available during the event, if required. The Reactor Recirculation (RR) CE! Pumps downshifted as required and there were no Safety Relief Valve actuations. All other systems operated as expected during the reactor scram with exception of the 1B Turbine Driven Reactor Feedwater (FW) SJ! Pump (TDRFP). The 1B TDRFP did not trip when the manual pushbutton was depressed from the control room, but was tripped using the overspeed test trip. The consequence of the failure to trip of the 1B TDRFP is that vessel overfill protection might be degraded. Troubleshooting of the trip function for the FW turbine indicated that a prolonged trip signal would achieve the turbine trip. If the trip demand had occurred due to high water level (instead of operator demand), the trip signal would seal in, assuring overfill protection trip.

E. CORRECTIVE ACTIONS

Under Work Request L00754, an adhesive was applied to the mounting bolts to inhibit vibrating loose on Limit Switch SVOS-2. The mounting bolts were tightened and proper continuity of the circuit was verified.

Temporary System Changes for Unit 1 and Unit 2 will install a

removable banana jumper which, when removed, will prevent the closing of Turbine Stop Valves 1, 3, & 4 when Turbine Stop Valve 2 goes closed (Figure 2). The valves will still close if the turbine trips. The jumper will be installed at shutdown or scram and removed after the Stop Valves open during a startup. LaSalle Operating Procedure WP-TG-02, "Turbine Generator Startup", and LaSalle General Procedures LGP-2-1, "Normal Unit Shutdown", LGP-2-2, "Unit Shutdown from Power Operation to Hot Standby" and LGP-3-2 "Reactor Scram" will be revised to address control of these jumpers. LOS-AA-S1 "Shift Surveillances", will also be revised to require a digital alarm summary to be performed when the turbine is on line. Action Item Record (AIR) 373-200-90-04701 will track these procedure revisions.

E. CORRECTIVE ACTIONS

Modifications have been proposed to replace the seal-in circuit with a more reliable one for Unit 1 and Unit 2 (Figure 3). A proposed design has been submitted to General Electric which will use more reliable dry relay contacts in place of mercury wetted ones. This type of event could also occur if a mercury contact 'hangs up' during testing. The modification will also provide an input to the unit's visual annunciator system which will notify the operators that the Master/Slave relationship is inhibited due to the seal-in. Action Item Record (AIR) 373-200-90-04702 will track the completion of these modifications.

The 1B TDRFP trip pushbutton failure was investigated and found that a prolonged trip signal would still achieve a turbine trip. The trip failure is being further investigated via Work Request L01281. AIR 373-200-90-04703 will track completion of this work request.

F. PREVIOUS EVENTS

None

G. COMPONENT FAILURE DATA

Manufacturer Nomenclature Model Number MFG Part Number

Namco Limit Switch EA 700-90964

Figure 1 "ORIGINAL CIRCUITS" omitted.

Figure 2 "TEMP. SYSTEM CHANGE, 1-499-90" omitted.

Figure 3 "PROPOSED MODIFICATION, (Pending GE Review)" omitted.

Commonwealth Edison
LaSalle County Nuclear Station
Rural Route #1, Box 220
Marseilles, Illinois 61341
Telephone 815/357-6761

July 26, 1990

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Dear sir:

Licensee Event Report 990-010-00, Docket #050-373 is being submitted to your office in accordance with 10CFR50.73(a)(2)(iv).

G. J. Diederich
Station Manager
LaSalle County Station

GJD/JJT/ls

Enclosure

xc: Nuclear Licensing Administrator
NRC Resident Inspector
NRC Region III Administrator
INPO - Records Center

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